

IN THE CLAIMS

Please amend claims 1, 3, 4, 6, 11, 17, 19, 26, 32, 34, 35, 37 and 44; and add new claims 63-92 as follows:

1. (amended) An apparatus for screening members of a library, the apparatus comprising:

at least six [a plurality of] vessels for receiving library members, each of the at least six vessels having an inlet and an outlet;

a detector for analyzing vessel effluent; and

a fluid handling system for providing fluid flow simultaneously through the at least six vessels;

the fluid handling system comprising an entrance control volume in fluid communication with the inlet of each of the at least six vessels, an exit control volume in fluid communication with the outlet of each of the at least six vessels, and at least six [a plurality of] flow restrictors, each of the at least six flow restrictors providing fluid communication between one [each] of the at least six vessels and [one of] (i) the entrance control volume, or alternatively, [and] (ii) the exit control volume,

the [wherein] resistance to fluid flow in the fluid handling system being [is] greatest in the flow restrictors and the resistance to flow in each of the at least six flow restrictors being [is] approximately the same, such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the at least six vessels that is apportioned approximately equally between each of the at least six vessels.

3. (amended) The apparatus of claims 1 or 2 [,] further comprising a pressure regulator in the exit control volume.

4. (amended) The apparatus of claim 1 [,] further comprising a [hollow] sampling probe selectively positioned [in the exit control volume] to sample vessel effluent [fluid flowing from a single flow restrictor] and adapted to transport sampled fluid to the detector.

6. (amended) The apparatus of claim 1 [,] wherein the fluid handling system further comprises [further comprising:]

at least six [a plurality of] outlet conduits and a selection valve, the outlet conduits providing fluid communication between the outlet of each of the at least six vessels and the selection valve;

a sample bypass and a sampling valve, the sample bypass providing fluid communication between the selection valve and the sampling valve; and

a return line [, the return line] providing fluid communication between the sampling valve and the exit control volume;

[wherein] the selection valve being [is] adapted to divert fluid from a selected vessel to the sample bypass while allowing fluid from non-selected vessels to flow to the exit control volume,

[and] the sampling valve being [is] adapted to provide selective fluid communication between the sample bypass and the return line, and between the sample bypass and the detector.

11. (amended) The apparatus of claim 1 [,] further comprising a system for regulating temperature of each of the at least six vessels.

12. (amended) An apparatus for screening members of a library, the apparatus comprising:

a plurality of vessels for receiving library members, each of the plurality of vessels having an inlet and an outlet;

a detector for analyzing vessel effluent; and

a fluid handling system comprising:

an entrance control volume and a plurality of flow restrictors, the flow restrictors providing fluid communication between the entrance control volume and the inlet of each of the plurality of vessels.

a plurality of outlet conduits and a selection valve, the outlet conduits providing fluid communication between the outlet of each of the plurality of vessels and the selection valve;

a sample bypass and a sampling valve, the sample bypass providing fluid communication between the selection valve and the sampling valve; and

a return line and an exit control volume, the return line providing fluid communication between the sampling valve and the exit control volume,

[wherein] the selection valve being [is] adapted to divert fluid from a selected vessel to the sample bypass while allowing fluid from non-selected vessels to flow to the exit control volume [via a common exhaust port],

[and] the sampling valve providing [provides] selective fluid communication between the sample bypass and the detector, and between the sample bypass and the return line exit control volume,

the [wherein] resistance to fluid flow in the fluid handling system being [is] greatest in the flow restrictors and the resistance to flow in each of the plurality of flow restrictors being [is] approximately the same, so that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow from the entrance control volume to the exit control volume that is apportioned approximately equally between each of the plurality of vessels.

19. (amended) The apparatus of claims 17 or 18 [,] further comprising a pressure regulator in the exit control volume.

26. (amended) The apparatus of claim 17 [,] further comprising a system for regulating temperature of each of the plurality of vessels.

32. (amended) A reactor for evaluating catalytic performance of members of a combinatorial library by contacting library members with a reactive fluid, the reactor comprising:

a plurality of reaction vessels for receiving library members, each of the plurality of reaction vessels having an inlet and an outlet; and

a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels;

~~the fluid handling system comprising an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels, an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels, and a plurality of flow restrictors, each of the plurality of flow restrictors providing fluid communication between one [each] of the plurality of reaction vessels and [one of] (i) the entrance control volume, or alternatively, [and] (ii) the exit control volume,~~

~~the [wherein] resistance to fluid flow in the fluid handling system being [is] greatest in the flow restrictors and the resistance to flow in each of the plurality of flow restrictors being [is] approximately the same, so that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the plurality of reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.~~

34. (amended) The reactor of claims 32 or 33 [,] further comprising a pressure regulator in the exit control volume.

35. (amended) The reactor [apparatus] of claim 32 [,] further comprising a sampling probe selectively positioned [in the exit control volume] to sample reaction vessel effluent [fluid flowing from a single flow restrictor] and adapted to transport sampled fluid to a detector.

37. (amended) The reactor [apparatus] of claim 32 [,] wherein the fluid handling system further comprises [further comprising:]

a plurality of outlet conduits and a selection valve, the outlet conduits providing fluid communication between the outlet of each of the plurality of reaction vessels and the selection valve;

a sample bypass and a sampling valve, the sample bypass providing fluid communication between the selection valve and the sampling valve; and

32
a return line [, the return line] providing fluid communication between the sampling valve and the exit control volume;

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[wherein] the selection valve being [is] adapted to divert fluid from a selected reaction vessel to the sample bypass while allowing fluid from non-selected reaction vessels to flow to the exit control volume,

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[and] the sampling valve being [is] adapted to provide selective fluid communication between the sample bypass and the return line, and between the sample bypass and a detector

32
44. (amended) The reactor [apparatus] of claim 32 [,] further comprising a system for regulating temperature of each of the plurality of reaction vessels.

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63. (new) The apparatus of claim 1 wherein the fluid handling system further comprises a selection valve providing selective fluid communication between the outlet of a selected vessel and the detector, such that a fluid can be sequentially directed from the selected vessel to the detector.

32
64. (new) The apparatus of claim 1 wherein the fluid handling system further comprises a fluid distribution valve providing selective fluid communication between the entrance control volume and the inlet of a selected vessel, such that a fluid can be sequentially directed into the selected vessel.

32
65. (new) The apparatus of claim 64 wherein the fluid handling system further comprises

a selection valve providing selective fluid communication between a selected vessel and the detector, such that a fluid can be sequentially directed from the selected vessel to the detector, and

a control system for synchronizing the fluid distribution valve and the selection valve such that a time interval between initial contact of the fluid with a library member in a vessel and analysis of the vessel effluent is about the same for the at least six vessels.

orney Docket No. 98-13
PATENT

66. (new) An apparatus for screening catalysts comprising the reactor of claim 32 and a detector for analyzing vessel effluent, wherein the fluid handling system further comprises a selection valve providing selective fluid communication between the outlet of a selected vessel and the detector, such that a fluid can be sequentially directed from the selected vessel to the detector.

67. (new) The reactor of claim 32 wherein the fluid handling system further comprises a fluid distribution valve providing selective fluid communication between the entrance control volume and the inlet of a selected vessel, such that a fluid can be sequentially directed into the selected vessel.

68. (new) An apparatus for screening catalysts comprising the reactor of claim 67 and a detector for analyzing vessel effluent, wherein the fluid handling system further comprises

a selection valve providing selective fluid communication between a selected vessel and a detector, such that a fluid can be sequentially directed from the selected vessel to the detector, and

a control system for synchronizing the fluid distribution valve and the selection valve such that a time interval between initial contact of the fluid with a library member in a reaction vessel and analysis of reaction vessel effluent is about the same for the plurality of reaction vessels.

69. (new) A reactor for screening catalysts, the reactor comprising a plurality of reaction vessels for receiving catalysts, each of the plurality of reaction vessels having an inlet and an outlet, and

a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels, the fluid handling system comprising an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels,

an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels, and

7
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a plurality of flow restrictors or regulators, each of the plurality of flow restrictors or regulators providing fluid communication between one of the plurality of reaction vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume, the flow restrictors or regulators being adapted such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.

70. (new) An apparatus for screening catalysts comprising the reactor of claim 69 and a detector for analyzing reaction vessel effluent.

10
71. (new) An apparatus for screening catalysts, the apparatus comprising :
a plurality of reaction vessels for receiving catalysts, each of the plurality of reaction vessels having an inlet and an outlet,
a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels,
a detector for analyzing reaction vessel effluent, and
a sampling probe selectively positioned to sample reaction vessel effluent and adapted to transport the sampled fluid to the detector,
the fluid handling system comprising
an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels,
an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels, and
a plurality of flow restrictors or regulators, each of the plurality of flow restrictors or regulators providing fluid communication between one of the plurality of reaction vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume, the flow restrictors or regulators being adapted such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.

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12

72. (new) The apparatus of claim 71 further comprising a sampling valve and a return line, the sampling valve providing selective fluid communication between the sampling probe and the return line, and between the sampling probe and the detector, the return line venting fluid into the exit control volume.

73. (new) An apparatus for screening catalysts, the apparatus comprising
a plurality of reaction vessels for receiving catalysts, each of the plurality of reaction vessels having an inlet and an outlet;
a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels; and
a detector for analyzing reaction vessel effluent,
the fluid handling system comprising
an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels,
an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels,
a plurality of flow restrictors or regulators, each of the plurality of flow restrictors or regulators providing fluid communication between one of the plurality of reaction vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume, and
a selection valve providing selective fluid communication between the outlet of a selected reaction vessel and the detector, such that a test fluid can be sequentially directed from the selected reaction vessel to the detector,
the flow restrictors or regulators being adapted such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.

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13

74. (new) An apparatus for screening catalysts, the apparatus comprising:

38

orney Docket No. 98-13
PATENT

a plurality of reaction vessels for receiving catalysts, each of the plurality of reaction vessels having an inlet and an outlet;

a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels; and

a detector for analyzing reaction vessel effluent,

the fluid handling system comprising

an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels,

an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels,

a plurality of flow restrictors or regulators, each of the plurality of flow restrictors or regulators providing fluid communication between one of the plurality of reaction vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume,

a plurality of outlet conduits and a selection valve, the outlet conduits providing fluid communication between the outlet of each of the plurality of reaction vessels and the selection valve,

a sample bypass and a sampling valve, the sample bypass providing fluid communication between the selection valve and the sampling valve, and

a return line providing fluid communication between the sampling valve and the exit control volume,

the selection valve being adapted to divert fluid from a selected reaction vessel to the sample bypass while allowing fluid from non-selected reaction vessels to flow to the exit control volume,

the sampling valve being adapted to provide selective fluid communication between the sample bypass and the return line, and between the sample bypass and the detector,

the flow restrictors or regulators being adapted such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.

75. (new) An apparatus for screening catalysts, the apparatus comprising
a plurality of reaction vessels for receiving catalysts, each of the plurality of
reaction vessels having an inlet and an outlet;
a fluid handling system for providing fluid flow simultaneously through the
plurality of reaction vessels; and
a detector for analyzing reaction vessel effluent,
the fluid handling system comprising
an entrance control volume in fluid communication with a fluid distribution valve,
the fluid distribution valve providing selective fluid communication between the entrance
control volume and the inlet of a selected reaction vessel, such that a fluid can be
sequentially directed into the selected reaction vessel,
an exit control volume in fluid communication with the outlet of each of the
plurality of reaction vessels, and
a plurality of flow restrictors or regulators, each of the plurality of flow restrictors
or regulators providing fluid communication between one of the plurality of reaction
vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume,
the flow restrictors or regulators being adapted such that maintaining a higher
pressure in the entrance control volume than in the exit control volume results in
simultaneous fluid flow through the reaction vessels that is apportioned approximately
equally between each of the plurality of reaction vessels.

76. (new) The apparatus of claim 75 wherein the fluid handling system further
comprises a plurality of exhaust conduits providing fluid communication between the
fluid distribution valve and the exit control volume, wherein
the fluid distribution valve comprises a first valve portion and a second valve
portion, the first valve portion providing selective fluid communication between a test
fluid source and the flow restrictors or regulators and between the test fluid source and
the exhaust conduits, the second valve portion providing selective fluid communication
between an inert fluid source and the flow restrictors or regulators and between the inert
fluid source and the exhaust conduits,

the resistance to fluid flow in each of the plurality of exhaust conduits being approximately the same and being about equal to the resistance to fluid flow in each of the plurality of flow restrictors or regulators, so that fluid flow is apportioned approximately equally between each of the plurality of reaction vessels and plurality of exhaust conduits.

77. (new) The apparatus of claim 75 wherein the fluid handling system further comprises a selection valve providing selective fluid communication between a selected reaction vessel and the detector such that a test fluid can be sequentially directed from the selected reaction vessel to the detector.

78. (new) The apparatus of claim 75 wherein the fluid handling system further comprises

a selection valve providing selective fluid communication between a selected reaction vessel and the detector, such that a test fluid can be sequentially directed from the selected reaction vessel to the detector, and

a control system for synchronizing the fluid distribution valve and the selection valve such that a time interval between initial contact of the test fluid with a library member in a reaction vessel and analysis of reactor effluent is about the same for the plurality of reaction vessels.

79. (new) An apparatus for screening catalysts, the apparatus comprising a plurality of reaction vessels for receiving catalysts, each of the plurality of reaction vessels having an inlet and an outlet;

an assembly for containing the reaction vessels, the assembly comprising a base block and a cover block removably attached to the base block, the base block including a top surface having a plurality of wells formed thereon, the cover block including a bottom surface disposed on the top surface of the base block and having a plurality of depressions formed thereon, each of the plurality of depressions being in substantial alignment with one of the wells, such that the aligned depressions and wells form reaction vessels or cavities for containing reaction vessels,

orney Docket No. 98-13
PATENT

a fluid handling system for providing fluid flow simultaneously through the plurality of reaction vessels; and

a detector for analyzing reaction vessel effluent,

the fluid handling system comprising

an entrance control volume in fluid communication with the inlet of each of the plurality of reaction vessels,

an exit control volume in fluid communication with the outlet of each of the plurality of reaction vessels, and

a plurality of flow restrictors or regulators, each of the plurality of flow restrictors or regulators providing fluid communication between one of the plurality of reaction vessels and (i) the entrance control volume, or alternatively, (ii) the exit control volume,

the flow restrictors or regulators being adapted such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the reaction vessels that is apportioned approximately equally between each of the plurality of reaction vessels.

80. (new) The apparatus of claim 79 wherein the assembly for containing the reaction vessels further comprises inlet ports and outlet ports located on the bottom surface of the base cover, each of the inlet ports providing fluid communication with the inlet of only one of the reaction vessels, each of the outlet ports providing fluid communication with the outlet of only one of the reaction vessels.

B24

81. (new) The apparatus of claim 79 wherein the assembly for containing the reaction vessels further comprises an inlet port located on the bottom surface of the base block, and outlet ports located on the top surface of the cover block, the inlet port providing fluid communication with an entrance control volume that provides fluid communication with the inlets of the reaction vessels, each of the reaction vessel outlet ports providing fluid communication with the outlet of only one of the reaction vessels.

82. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein the fluid handling system comprises flow restrictors.

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83. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein each of the plurality of flow restrictors or regulators provides fluid communication between the entrance control volume and one of the plurality of reaction vessels.

84. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein the fluid handling system comprises flow restrictors, and each of the plurality of flow restrictors or regulators provides fluid communication between the entrance control volume and one of the plurality of reaction vessels.

85. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein each of the plurality of flow restrictors or regulators provides fluid communication between one of the plurality of reaction vessels and the exit control volume.

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86. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein the fluid handling system is a gas handling system for providing gaseous flow simultaneously through the plurality of reaction vessels.

B12
87. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein the fluid handling system is a liquid handling system for providing liquid flow simultaneously through the plurality of reaction vessels.

88. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 further comprising a system for regulating the temperature of each of the plurality of reaction vessels.

89. (new) The apparatus of claims 70, 71, 73, 74, 75 or 79 wherein the detector is selected from the group consisting of a gas chromatograph, a mass spectrometer, a visible spectrometer, an ultraviolet spectrometer and an infrared spectrometer.